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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/646,671	09/20/2000	Shouochi Uno	501.39082x00	2273
7590 05/21/2004				
Antonelli Terry Stout & Kraus Suite 1800 1300 North Seventeenth Street Arlington, VA 22209			EXAMINER GURLEY, LYNNE ANN	
			ART UNIT 2812	PAPER NUMBER

DATE MAILED: 05/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/646,671

Applicant(s)

UNO ET AL.

Examiner

Lynne A. Gurley

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-8,13-17 and 22-41 is/are pending in the application.
- 4a) Of the above claim(s) 22-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-8,13-17 and 25-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

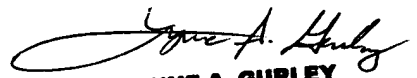
- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 9/19/00 to 8/25/03.

- 4) ☐ Interview Summary (PTO-2800, AU 2812)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____


LYNNE A. GURLEY
PRIMARY PATENT EXAMINER

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DETAILED ACTION

1. Applicant's election without traverse of claims 1, 3-8, 13-17 and 25-41 in Paper No.

9/2/03 is acknowledged.

2. Claims 22-24 have been withdrawn from further consideration pursuant to 37 CFR

1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 9/2/03.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

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invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1, 3-8, 13-17 and 25-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bjorkman et al. (US 6,669,8585, dated 12/30/03, filed 11/5/02 as a continuation of US Pat. No. 6,340,435, filed 6/9/99).

7. Bjorkman shows the method substantially as claimed, in figures 1-2, and corresponding text in a method which etches organosiloxane low-k films using fluorocarbon gases, oxygen-containing gases and carrier gases (Ar and Nitrogen). See column 3, lines 20-25, lines 30-35, lines 44-46 and lines 55-57; Column 6, lines 43-50; column 7, lines 1-5; column 8, lines 46-50; column 10, lines 13-21; and especially for etching parameters, flow rates (which includes Ar being the greatest flow rate, column 14, lines 40-47; column 15, lines 55-65; and column 17. Also, see columns 18-21 for examples. CO is excluded from etch gases for forming horizontal interconnects (abstract).

8. Bjorkman lacks anticipation only in not teaching: 1) a combination of nitrogen and Ar may be used, although nitrogen is mentioned (column 15, lines 62-63); 2) more than one organosiloxane may be used; and 3) two etch steps.

9. It would have been obvious to one of ordinary skill in the art to have used a combination of nitrogen and Ar gas for the carrier gases, in the method of Bjorkman, with the motivation that both remove the passivating deposits on the substrate as mentioned in column 15, lines 62-63. Also, see Cheung et al. (US 6,660,663, column 13, lines 3-6) for support.

10. It would have been obvious to one of ordinary skill in the art to have applied the method to a structure containing more than one organosiloxane, with the motivation that Bjorkman

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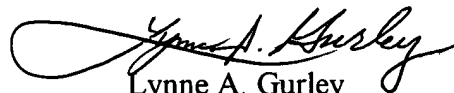
acknowledges that the organosiloxane may function as an etch stop for selective etching. The carbon content would make the selectivity between the two siloxanes efficient.

11. It would have been obvious to one of ordinary skill in the art to have used two etch steps to ensure the selectivity or to obtain a specific etch profile in the siloxane films. Note that the thicknesses of the films in % on the bottom of the recesses, the underlying films and, the relative etch selectivities of the films are considered to be parameters of optimization, especially when considering multiple level interconnect schemes.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynne A. Gurley whose telephone number is 571-272-1670. The examiner can normally be reached on M-F 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on 571-272-1679. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Lynne A. Gurley
Primary Patent Examiner
TC 2800, AU 2812

LG
May 17, 2004